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September 29, 2005

Mark B. Quatt Registration No. 30,484

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Kennedy et al
Serial No.: 10/689,146
Filing Date: 10-20-03
Docket No: D-43375-02
Examiner: Aughenbaugh, Walter
Group Art Unit: 1772
Title: OXYGEN DETECTION SYSTEM FOR A SOLID ARTICLE

APPEAL BRIEF

Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

This Appeal Brief is being filed in support of a Notice of Appeal filed on April 29, 2005, in which the Applicants appealed from the rejection of claims 24, 25, 27, and 29 to 36 in the Office Action dated February 3, 2005.

The Commissioner is authorized to charge the fee of $500 for filing an Appeal Brief, to Deposit Account No. 07-1765.

The Commissioner is authorized to charge any additional fees that may be required or credit any overpayment to Deposit Account No. 07-1765.

A Petition for three (3) months extension of time is enclosed.

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Respectfully submitted,

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9-29-05
date

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Real Party in Interest

The real party in interest in this patent application is Cryovac, Inc.

Related Appeals and Interferences

There are no other appeals or interferences known to Applicants, the Applicants' legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

The claims now on Appeal are claims 24, 25, 27, and 29 to 36.

By preliminary amendment of October 20, 2003, claims 1 to 23 filed with this divisional application were canceled, and claims 24 to 28 were added.

Claims 24 to 28 were rejected in an Office Action dated August 4, 2004.

By amendment of November 3, 2004, claim 24 was amended, claims 26 and 28 were canceled, and claims 29 to 36 were added.

Claims 24, 25, 27, and 29 to 36 were rejected in the Final Office Action dated February 3, 2005.

Applicants thereafter filed the Notice of Appeal on April 29, 2005.

A copy of the claims presently on Appeal appears in the Claims Appendix beginning on page 16.

Status of Amendments

The claims now on Appeal are claims 24, 25, 27, and 29 to 36.

These are the same claims that were rejected in the Final Office Action dated February 3, 2005.

No amendments since that Office Action have been sought or entered.

A copy of the claims presently on Appeal appears in the Appendix.

Summary of the Invention

(References to the specification by page and line numbers are shown in parentheses.)

Oxygen spoils many products. Foods and many other products may perish or experience diminished shelf life when stored too long in the presence of oxygen. To combat this problem, manufacturers of packaging materials have developed packaging materials and systems to protect these products by providing a package environment, or "headspace", with reduced oxygen levels. (page 1, lines 22 to 27).

In many cases, the low oxygen level that can be obtained with these packaging systems is still insufficient to provide the desired shelf life. In these cases, packagers find it advantageous to include an oxygen scavenger within a low oxygen modified atmosphere package (MAP) or a vacuum package (VP). (page 1, lines 28 to 31).

For oxygen scavengers made from ethylenically unsaturated hydrocarbons and their functional equivalents, oxygen scavenging activity is triggered with actinic radiation, typically in the form of ultra violet (UV-C) light. (page 2, lines 1 to 3).

Unfortunately, oxygen scavengers do not always activate on command. This may result from a number of factors, including defective scavenger compositions, inadequate triggering conditions, operator error, or a combination of these or other factors. Conventional scavengers do not themselves visually indicate whether or not they are active. In response to this uncertainty, operators of packaging assembly plants prefer to verify scavenger activity as soon as possible after triggering. The longer a failed triggering attempt remains undiscovered, the more waste and expense is incurred, especially where packaging equipment operates at high speeds. (page 2, lines 9 to 16).

Prior art methods for verifying oxygen scavenger activity in a low oxygen package involve detecting oxygen concentrations in the package headspace. The measurement cannot take place until after the package has been assembled and equilibrium of oxygen levels established among the headspace, package layers, and package contents. Detection of sufficiently reduced oxygen levels within the headspace allows one to infer successful scavenger activation. (page 2, lines 17 to 22).

Under this approach, one typically has two options, neither of which is particularly satisfactory. One option is to leave an oxygen indicator in the package headspace after it has been assembled and sealed; for example, an indicator comprising glucose and methylene blue, encased within a sachet. The sachet is left inside the package after it is

sealed. A color change within the sachet indicates the presence of unwanted oxygen. (page 2, lines 23 to 28).

This approach has several disadvantages, however. Sachets must be attached to the package to avoid their being accidentally ingested by the consumer. Some package contents require a moisture-free storage environment. Yet, in the case of the glucose/methylene blue indicator, moisture may be required to produce a color change. Also, sachets potentially introduce contaminants or other substances into the package that may be incompatible with its contents or accidentally ingested. For some applications, manufacturers may not want to leave indicators in packages where consumers may misinterpret the information the indicator provides. (page 2, line 29, to page 3, line 2).

Another option is to use probes to measure the gas content within the headspace. Unfortunately, probes that rely on gas chromatography and other such analytical techniques cannot measure oxygen concentration in vacuum packages, where there is substantially no atmosphere to measure. In all cases, probes require sacrificing the sampled package. They invariably require some sort of device that will penetrate the package and remove a portion of the gas within the headspace. The device inevitably leaves a hole in the package, destroying the integrity of the package. (page 3, lines 3 to 10).

Measuring headspace oxygen, whether by indicator or invasive probe, has an important additional disadvantage as well. It requires time, often hours, for scavengers seated deep within the walls of MAP materials to consume enough oxygen to affect measurably the oxygen levels in the headspace. This is often further delayed and complicated by out-gassing by package contents (as occurs with foods) or by poor circulation of gasses within the package. Clearly, there remains a need in the art for a significantly faster, less wasteful article and method for verifying oxygen scavenger activity in a package, than the old method that relies on measuring oxygen concentration within the headspace of an already assembled package. (page 3, lines 30 to 32;).

In a first aspect, in accordance with the invention, a patch comprises a first layer comprising an oxygen barrier having an oxygen transmission rate of no more than 100 $cc/m^2/24hr$ at 25°C, 0% RH, 1 atm (ASTM D 3985); a second layer comprising a pressure sensitive adhesive, the adhesive adhered to the first layer; and an oxygen indicator, disposed on the second layer, comprising a luminescent compound; wherein the oxygen indicator is disposed as a printed image on the second layer. (page 3, lines 11 to 19; page 11, lines 11 to 15; page 13, lines 6 to 11; page 15, lines 20 to 24; and page 32, line 19 to page 33, line 2).

In a second aspect, in accordance with the invention, a patch comprises a first layer comprising an oxygen barrier having an oxygen transmission rate of no more than 100 $cc/m^2/24hr$ at 25°C, 0% RH, 1 atm (ASTM D 3985); a second layer comprising an adhesive, the adhesive adhered to the first layer; and an oxygen indicator, disposed on the second layer, comprising a luminescent compound; wherein the oxygen indicator is disposed as a printed image on the second layer comprising the adhesive; and wherein the oxygen indicator is not coextensive with the second layer comprising the adhesive. (page 3, lines 11 to 19; Figures 6, 7, and 8; page 13, line 6 through page 14, line 11).

In a third aspect, in accordance with the invention, a patch comprises a first layer comprising an oxygen barrier having an oxygen transmission rate of no more than 100 $cc/m^2/24hr$ at 25°C, 0% RH, 1 atm (ASTM D 3985); a second layer comprising an adhesive, the adhesive adhered to the first layer; and an oxygen indicator, disposed on the second layer, comprising a luminescent compound; wherein the oxygen indicator is disposed as a printed image on the second layer; and wherein the patch is adapted to be adhered, by means of the adhesive, to a packaging material. (page 3, lines 11 to 19; page 11, lines 11 to 15; page 13, line 6 through page 14, line 11; page 15, lines 20 to 24; Figures 6, 7, and 8; and page 32, line 19 to page 33, line 2).

Issues to be reviewed on Appeal

The issues to be reviewed on Appeal (per the Office Action mailed February 3, 2005) are as follows:

1. Claims 24 and 25 stand rejected under §103 (a) as being unpatentable over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876) and in further view of Harvey et al. (US 6,590,031).

2. Claim 27 stands rejected under 35 U.S.C. §103 (a) as being unpatentable over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876) and in further view of Harvey et al. (US 6,590,031) and in further view of Khalil et al. (US 5,043,286).

3. Claims 29 to 31 and 33 to 35 stand rejected under §103 (a) as being unpatentable over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876).

4. Claims 32 and 36 stand rejected under §103 (a) as being unpatentable over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876) and in further view of Khalil et al. (US 5,043,286).

Argument

1. Claims 24 and 25 are patentable under 35 U.S.C. §103 (a) over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876) and in further view of Harvey et al. (US 6,590,031).

The Final Office Action recognizes that Speer et al. fail to explicitly teach that the adhesive is a pressure sensitive adhesive, and that an oxygen indicator is disposed on the second layer (page 3 3rd paragraph of Paragraph No. 8 of the Final Office Action).

Applicants agree, and respectfully add that Speer et al. fail to teach any oxygen indicator.

Also, Speer et al. fail to teach that the oxygen indicator is disposed as a printed image on the second layer.

The Office Action refers at page 3, last line to page 4, line 2 to Inoue et al. as teaching that

> the oxygen indicator composition includes an adhesive binder (col. 3, line 48 – col.4, line 3) and is printed on a substrate such as the inside of a transparent film having an oxygen barrier property (col. 4, lines 9 – 19).

Looking at Inoue et al., the adhesive referred to in this portion of Inoue et al. is a binder, such as ethyl cellulose, polyvinyl alcohol or starch that, along with a pigment, can be added to the printing composition in order to ensure the adhesion between the main component/the dyestuff and the substrate. The Office Action points to no portion of Inoue et al. that teaches a pressure sensitive adhesive. Indeed, this was not be expected because Inoue et al. refer to their oxygen indicator as being used in the form of a tablet (col. 12, lines 26 to 28; Control Run 1 at col. 7, lines 64 to 68; Control Run 3 at col. 9, lines 32 to 35; and Example 96, lines 54 to 55) which apparently is dropped in a bag to function as an oxygen indicator; or the oxygen indicator is in the form of a printed paper, non-woven fabric sheet, etc., where the oxygen indicator is sealed *in* a bag. See Examples 31 to 55 and 64 to 87 at column 7, lines 1 to 54 of Inoue et al. ("Each of the oxygen indicators . . . was sealed . . . in KON/PE bag"); also Examples 88 to 94 at column 9, lines 1 to 6 (("Each of the oxygen indicators were sealed in the bag . . .").

Thus, there appears to be no teaching to adhere the oxygen indicator of Inoue et al. to another article, and certainly no teaching to use a pressure sensitive adhesive in combination with the oxygen indicator of Inoue et al.

At page 4 of the Final Office Action, second paragraph and page 5, first paragraph, Harvey et al. is cited for the teaching of a pressure sensitive adhesive comprising maleic anhydride that can be coated onto polymeric films.

The Final Office Action states that

> one of ordinary skill in the art would have recognized to have used the pressure sensitive adhesive comprising maleic anhydride taught by Harvey et al. as the maleic anhydride modified polymer adhesive of Speer et al. since the pressure sensitive adhesive comprising maleic anhydride taught by Harvey et al. is a notoriously well known pressure sensitive adhesive material for use in articles such as labels, marking films, etc. (e.g. the adhesive sheet inserts taught by Speer et al.) as taught by Harvey et al.

Applicants respectfully disagree. Maleic anhydride is not maleic anhydride modified polymer adhesive. Maleic anhydride is a pressure sensitive adhesive. However, no teaching has been offered that maleic anhydride modified polymer adhesive is a pressure sensitive adhesive. The Final Office Action seems to recognize this by stating that Speer et al. fail to explicitly teach that the adhesive is a pressure sensitive adhesive (page 3 3rd paragraph of Paragraph No. 8 of the Final Office Action). Nor is there any indication that any of the anhydride modified polymers of column 9, lines 11 to 24 are or function as a pressure sensitive adhesive. The reference at column 4, lines 9 to 14 of Speer et al. to a "adhesive or non-adhesive sheet insert" offers no guidance as to the type of adhesives contemplated. It is noted however that an "insert" is a device that could typically be expected to be dropped into (inserted into) a container; see for example the tablets of Inoue et al. that in various examples are inserted into bags.

In summary, applicants respectfully submit that the only reference relied on in the Office Action that positively recites a pressure sensitive adhesive is Harvey et al.. This reference does not appear to have anything to do with neither an oxygen indicator comprising a luminescent compound nor an oxygen barrier layer. Applicants submit that the fact that Harvey et al. teaches a maleic anhydride adhesive, and Speer et al. teaches a maleic anhydride modified *polymer*, is an insufficient basis on which to provide motivation to combine oxygen barrier, oxygen indicator comprising a luminescent compound, and pressure sensitive adhesive layer, with the oxygen indicator disposed as a printed image on the second (pressure sensitive adhesive) layer. This is especially so because it has not

been demonstrated that a maleic anhydride modified polymer functions as a pressure sensitive adhesive.

In the present invention, a very useful, and now commercialized application is the use of the patch as a label that is adhered to a surface of a packaging material before the process of verification of oxygen scavenging is carried out by e.g. QC personnel. The pressure sensitive adhesive of the second layer permits the patch as a label to be easily and conveniently adhered to any appropriate part of the packaging material. See e.g. page 7, lines 19 to 21; page 11, lines 11 to 15; and Figure 6 (where a portion of the adhesive layer 63 is in direct contact with a sealant layer 68 of the primary packaging material 60) and also Figures 7 and 8.

2. Claim 27 is patentable under 35 U.S.C. §103 (a) over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876) and in further view of Harvey et al. and in further view of Khalil et al.

Claim 27 is dependent on claim 24, and therefore includes all the limitations of claim 24. Applicants rely on the above remarks with respect to claim 24 to traverse this rejection.

3. Claims 29 to 31 and 33 to 35 are patentable under 35 U.S.C. §103 (a) over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876).

The Final Office Action at paragraph 10, pages 6 to 8, applies the teachings of Speer et al. and Inoue et al. similar to those applied to the claims already discussed. Applicants refer to their arguments above and apply them mutatis mutandis to claims 29 to 31 and 33 to 35.

One feature of claim 29 now on appeal is that the oxygen indicator is not coextensive with the second layer comprising the adhesive.

On this point, the Final Office Action states, at page 7, last two lines, and page 8, first three lines, that

> the oxygen indicator taught by Inoue et al. is necessarily not coextensive with the second (adhesive) layer of Speer et al. in the instance where the indicator is printed onto the second (adhesive) layer of Speer et al. in a discontinuous manner/pattern in order to make use of the indicator in an economical manner or an aesthetic manner as discussed above.

Applicants respectfully submit that this reasoning confuses and blends the teachings of the two cited references, and ignores the plain teaching of Inoue et al..

First, this reasoning makes unclear what is being relied on in Inoue et al., and what is being relied on in Speer et al. The statement effectively creates a hybrid "reference" that is a combination of the two references, rather than evaluating the teachings of each reference.

No teaching has been identified in the Office Action, for either reference, directed to a layer of oxygen indicator not coextensive with the second layer comprising the adhesive.. Of course, Speer et al. does not teach an oxygen indicator at all.

The adhesive of Inoue et al. is a binder, such as ethyl cellulose, polyvinyl alcohol or starch that, along with a pigment, can be added to the printing composition to ensure the adhesion between the main component/the dyestuff and the substrate (column 3, line 48 to column 4, line 3 of Inoue et al.). Thus the binder and printing composition are intermixed, such that where the oxygen indicator is located, adhesive is present, and vice versa. The binder and printing composition of Inoue et al. are by design and purpose coextensive.

In contrast, for certain embodiments of the present invention, as recited in claim 29, it is beneficial that the oxygen indicator is not coextensive with the second layer comprising the adhesive.

In the present specification at Figures 6, 7, and 8, and the supporting text for those drawings found at page 13, line 6 through page 14, line 11, it can be seen that the adhesive of the second layer extends further laterally than the oxygen indicator, and the oxygen indicator is therefore not coextensive with the adhesive. When the patch of the present invention is adhered to a packaging film, this allows effective shielding of the oxygen indicator in such a manner that the indicator is encapsulated by the adhesive, and the indicator is thus shielded from environmental oxygen, including oxygen from outside the finished package, as well as any head space oxygen if present, and dissolved oxygen from the oxygen sensitive product 61 if present, during the time that the indicator is to be monitored for an indication of the presence or absence of oxygen dissolved in the solid material carrying the oxygen scavenger. The adhesive layer has sufficient lateral width to prevent substantial influx of oxygen into the indicator from the lateral edges of the adhesive during the time the indicator is to be used.

One feature of claim 33 now on appeal is that the patch is adapted to be adhered, by means of the adhesive, to a packaging material.

On this point, the Final Office Action states, at page 8, first full paragraph, that

> the patch (the adhesive sheet insert of Speer et al., col. 4, lines 9-14) taught by Speer et al. and Inoue et al. is adapted to be adhered, by means of the adhesive, to a packaging material because Speer et al. teach an adhesive sheet, which necessarily has an outer adhesive layer and which therefore is adapted to be adhered to a packaging material via the adhesive.

Applicants respectfully disagree.

The Office Action again confuses and intermixes two references.

The allusion in Speer et al. to an "adhesive or non-adhesive sheet insert" offers no guidance as to the type of adhesives contemplated. It is noted however that an "insert" is a device that could typically be expected to be dropped into (inserted into) a container; see for example the tablets of Inoue et al. that in various examples are inserted into bags.

Speer et al. does not address or suggest an oxygen indicator.

The cited portion of the Office Action also incorrectly suggests that "the patch . . . taught by Speer et al. and *Inoue et al.* is adapted to be adhered, by means of the adhesive, to a packaging material . . ". Applicants respectfully submit that this is incorrect. Inoue et al. do not disclose a patch. As discussed above, they disclose a tablet, or a printed substrate, both of which are designed to be inserted *in* a bag to provide oxygen indicating functionality. Nothing has been pointed to in Inoue et al. to suggest a patch. Nothing in the reference has been identified that suggests adapting their oxygen indicator to be adhered to a packaging material via an adhesive. As discussed earlier, the adhesive of Inoue et al. is a binder to hold the indicator composition together.

<u>4. Claims 32 and 36 are patentable under 35 U.S.C. §103 (a) over Speer et al. (US 5,529,833) in view of Inoue et al. (US 5,358,876) and in further view of Khalil et al.</u>

Claim 32 is dependent on claim 29, and therefore includes all the limitations of claim 29. Claim 36 is dependent on claim 33, and therefore includes all the limitations of claim 33. Applicants rely on the above remarks with respect to claims 29 and 33 to traverse this rejection.

Applicants respectfully ask the Board to reverse the finding of the Office Action of February 3, 2005, and to allow claims 24, 25, 27, and 29 to 36.

Claims Appendix

24. A patch comprising:

a) a first layer comprising an oxygen barrier having an oxygen transmission rate of no more than 100 cc/m^2/24hr at 25°C, 0% RH, 1 atm (ASTM D 3985);

b) a second layer comprising a pressure sensitive adhesive, the adhesive adhered to the first layer; and

c) an oxygen indicator, disposed on the second layer, comprising a luminescent compound;

wherein the oxygen indicator is disposed as a printed image on the second layer.

25. The patch of claim 24 wherein the oxygen barrier comprises a material selected from the group consisting of polyester, polyamide, ethylene vinyl alcohol copolymer, polyvinyl alcohol homopolymer, polyvinyl chloride, homopolymer and copolymer of polyvinylidene chloride, polyethylene naphthalate, polyacrylonitrile homopolymer and copolymer, liquid crystal polymer, SiO_x, carbon, metal, and metal oxide.

27. The patch of claim 24 wherein the luminescent compound comprises at least one material selected from the group consisting of metallo derivatives of octaethylporphyrin, tetraphenylporphyrin, tetrabenzoporphyrin, or the chlorins, bacteriochlorins, or isobacteriochlorins thereof.

29. A patch comprising:

a) a first layer comprising an oxygen barrier having an oxygen transmission rate of no more than 100 cc/m^2/24hr at 25°C, 0% RH, 1 atm (ASTM D 3985);

b) a second layer comprising an adhesive, the adhesive adhered to the first layer; and

c) an oxygen indicator, disposed on the second layer, comprising a luminescent compound;

wherein the oxygen indicator is disposed as a printed image on the second layer comprising the adhesive; and

wherein the oxygen indicator is not coextensive with the second layer comprising the adhesive.

30. The patch of claim 29 wherein the oxygen barrier comprises a material selected from the group consisting of polyester, polyamide, ethylene vinyl alcohol copolymer, polyvinyl alcohol homopolymer, polyvinyl chloride, homopolymer and copolymer of polyvinylidene chloride, polyethylene naphthalate, polyacrylonitrile homopolymer and copolymer, liquid crystal polymer, SiO_x, carbon, metal, and metal oxide.

31. The patch of claim 29 wherein the adhesive comprises a material selected from the group consisting of hot melt adhesive, silicone adhesive, acrylic pressure sensitive adhesive, solvent cast adhesive, ultraviolet cured acrylic adhesive, and electron beam cured acrylic adhesive.

32. The patch of claim 29 wherein the luminescent compound comprises at least one material selected from the group consisting of metallo derivatives of octaethylporphyrin, tetraphenylporphyrin, tetrabenzoporphyrin, or the chlorins, bacteriochlorins, or isobacteriochlorins thereof.

33. A patch comprising:

a) a first layer comprising an oxygen barrier having an oxygen transmission rate of no more than 100 cc/m^2/24hr at 25°C, 0% RH, 1 atm (ASTM D 3985);

b) a second layer comprising an adhesive, the adhesive adhered to the first layer; and

c) an oxygen indicator, disposed on the second layer, comprising a luminescent compound;

wherein the oxygen indicator is disposed as a printed image on the second layer; and

wherein the patch is adapted to be adhered, by means of the adhesive, to a packaging material.

34. The patch of claim 33 wherein the oxygen barrier comprises a material selected from the group consisting of polyester, polyamide, ethylene vinyl alcohol copolymer, polyvinyl alcohol homopolymer, polyvinyl chloride, homopolymer and copolymer of

polyvinylidene chloride, polyethylene naphthalate, polyacrylonitrile homopolymer and co-polymer, liquid crystal polymer, SiO_x, carbon, metal, and metal oxide.

35. The patch of claim 33 wherein the adhesive comprises a material selected from the group consisting of hot melt adhesive, silicone adhesive, acrylic pressure sensitive adhesive, solvent cast adhesive, ultraviolet cured acrylic adhesive, and electron beam cured acrylic adhesive.

36. The patch of claim 33 wherein the luminescent compound comprises at least one material selected from the group consisting of metallo derivatives of octaethylporphyrin, tetraphenylporphyrin, tetrabenzoporphyrin, or the chlorins, bacteriochlorins, or isobacteriochlorins thereof.

Evidence Appendix

No evidence described in 37 CFR §41.37(ix) was submitted by Appellant or entered by the Examiner.

Related Proceedings Appendix

There are no other appeals, interferences or judicial proceedings known to Appellant, Appellant's legal representative, or Assignee which may be related to, directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.